

Sheet (5)

Allocation of Resources

No. 1

Five workers (W_1, \dots, W_5) are available to work with the machines given in the matrix below. The entries in the matrix indicates the costs associated with each workers. Machine assignment X indicates that a worker cannot work on the indicated machines. M_n is a machine designed to replace one of existing machines. The problem is to find the best combination of machines and the optimal worker assignment.

What is the total cost of this assignment?

	M_1	M_2	M_3	M_4	M_5	M_n
W_1	12	3	6	X	5	9
W_2	4	11	X	5	X	3
W_3	8	2	10	9	7	5
W_4	X	7	8	6	12	10
W_5	5	8	9	4	6	X

No 2

A new office building has been constructed to allow centralization of administrative functions. Six regional managers will be moved to the new central location. All the

offices for managers are on the same floor. Each room has the same area and furnishings, but exposures and views differ. In order to please as many of managers as possible, the managers were asked to rank their preferences for offices, with 6 being the most desirable and 1 the least desirable. The following rankings were submitted.

	Office	A	B	C	D	E	F
Manager	P	4	2	5	1	3	6
	Q	1	3	5	2	4	6
	R	3	5	6	2	1	4
	S	2	4	6	1	3	5
	T	5	2	6	4	1	3
	U	1	6	3	5	2	4

Determine the assignment which will provide the most overall satisfaction.

No 3

The cell entries on three transportation problems represent shipping costs per unit transported.

Determine the optimal allocations.

a)

	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	
O ₁	2	1	4	0	1	2	18
O ₂	3	2	0	4	2	5	23
O ₃	1	3	3	5	3	0	6

b)

	D ₁	D ₂	D ₃	D ₄	
O ₁	80	120	60	30	290
O ₂	40	80	80	110	480
O ₃	120	20	40	50	180
O ₄	20	60	70	40	350
O ₅	30	50	70	30	200
	400	200	800	100	

c)

	D ₁	D ₂	D ₃	
O ₁	1	4	2	6
O ₂	2	1	3	4
O ₃	2	2	2	7
O ₄	4	3	1	5
O ₅	5	4	1	6
O ₆	1	3	5	7
	11	9	10	